

GENERAL SERVICES ADMINISTRATION  
Washington, DC 20405

January 30, 1991

FIRMR BULLETIN C-8

TO: Heads of Federal agencies

SUBJECT: Information accessibility for employees with  
disabilities

1. Purpose. This bulletin provides information and guidance regarding agencies' responsibility to meet the special Federal information processing (FIP) resource accommodation needs of individuals with disabilities.

2. Expiration date. This bulletin contains information of a continuing nature and will remain in effect until canceled.

3. Contents.

Topic	Paragraph
Related material.....	4
Information and assistance.....	5
Definitions.....	6
Acronyms.....	7
Public Law 99-506.....	8
COCA.....	9
General.....	10
Agency responsibilities.....	11
COCA services.....	12
Cancellation.....	13
Functional Specifications.....	Attachment A

4. Related material.

- a. FIRMR 201-18.001
- b. FIRMR 201-20.103-7
- c. GSA handbook, - "Managing End User Computing for Users with Disabilities"
- d. FIRMR Bulletin C-10 - "Telecommunications Accessibility for Hearing and Speech Impaired Individuals"

TC 90-1

Attachment

FEDERAL INFORMATION RESOURCES MANAGEMENT REGULATION  
APPENDIX B

## FIRMR Bulletin C-8

### 5. Information and assistance.

#### a. Technical

General Services Administration  
Clearinghouse on Computer Accommodation (KGDO)  
18th and F Streets, NW  
Washington, DC 20405

Voice or tdd: FTS 241-4906 or 202-501-4906.

#### b. Policy

General Services Administration  
Regulations and Analysis Division (KMR)  
18th and F Streets, NW  
Washington, DC 20405

Telephone: FTS 241-3194 or (202) 501-3194.

### 6. Definitions.

"Computer accommodation" means the acquisition or modification of FIP resources to minimize the functional limitations of employees in order to promote productivity and to ensure access to work-related information resources.

"Information accessibility" means the application or configuration of FIP resources in a manner that accommodates the functional limitations of individuals with disabilities so as to promote productivity and provide access to work-related or public information resources.

"Handicapped individuals" or "individuals with disabilities" means qualified individuals with impairments, as cited in 29 CFR 1613.702(f), who can benefit from electronic office equipment accessibility.

"Special peripheral" is defined in Section 508 of Pub. L. 99-506 as "a special needs aid that provides access to electronic equipment that is otherwise inaccessible to a handicapped individual."

## FIRMR Bulletin C-8

### 7. Acronyms.

COCA Clearinghouse on Computer Accommodation  
DSO Designated Senior Official  
FIP Federal Information Processing

8. Public Law 99-506. In 1986, Congress reauthorized the Rehabilitation Act of 1973, as amended (Pub. L. 99-506, 29 U.S.C. 794d). Section 508, as incorporated into the Act, mandates that guidelines be established to ensure that handicapped individuals may use electronic office equipment with or without special peripherals and that agencies comply with these guidelines in acquiring electronic equipment.

9. COCA. In 1985, GSA's Information Resources Management Service (IRMS) established an information resource center called COCA, to assist Federal agencies in providing information accessibility to individuals with disabilities.

### 10. General.

a. Accessibility. Workstations for Federal employees with sensory, cognitive, or mobility impairments may be equipped with special peripherals or software that provide access to computer technology, primarily microcomputers. This accessibility is a necessary link that enables handicapped employees to function efficiently and effectively on the job.

b. Equivalent access. Disabled individuals and non-disabled individuals should be provided equivalent access to electronic office equipment. FIP resources, particularly microcomputers, provide enhancement features, such as text enlarging and speech input and output, allowing disabled individuals to accomplish tasks previously impossible for them. For example, the inherent flexibility of microcomputers permits their adaptation to meet the specific needs of disabled individuals through the use of braille printers, spoken screen review, and keyboard replacement devices.

c. Functional specifications. Attachment A presents specifications that are organized by functional requirement into three categories: input, output and documentation. These specifications reflect the major areas that need to be considered during planning and acquisition.

d. Accessibility alternatives. Accessibility solutions range from third-party hardware and software add-ons, such as "layered" solutions, to hardware "built-ins" and operating system

enhancements. Agencies should attempt to provide the same equipment to all of their employees, whether or not they are disabled. For that reason, "built-in" accessibility solutions are preferable to "layered" solutions. Layering involves adding layers of software between the end-user and the operating system or application software. While this often complex solution may have advantages, such as increased function and performance, it can also have serious disadvantages. Disadvantages include increased costs, greater difficulty in maintaining software updates at the operating system level, and increased costs to train employees to utilize dissimilar equipment at different sites within the agency. For these reasons, layering should be selected as an accessibility solution only after careful analysis of its merits relative to that of "built-in" solutions.

11. Agency responsibilities.

a. DSO. The agency DSO for Federal information processing resources is the individual primarily responsible for ensuring electronic office equipment accessibility for current or prospective employees with disabilities. This responsibility also includes providing access to Federal public information resources for individuals with disabilities. The DSO or an authorized representative should monitor progress toward achieving electronic equipment accessibility goals. The Federal Information Resources Management Review Program is one means of monitoring this progress.

b. FIRMR requirement. The FIRMR requires that agencies shall provide FIP resource accessibility to individuals with disabilities and that agencies consider the guidance contained in FIRMR bulletins concerning this subject. This action is essential to enable handicapped employees to perform as productive employees.

c. Coordinated effort required. Agency management and technical personnel need to work closely with contracting officials when contracting for new or additional FIP resources to ensure accessibility to FIP resources by individuals with disabilities. Acquisition, management and technical personnel should:

(1) Provide to contracting officials, for inclusion in the solicitation, an inventory and description of any accommodation hardware or software currently being used with the resources scheduled for replacement or modification.

(2) Specify the need for a plan from prospective offerors that ensures functionally equivalent or better access to

## FIRMR Bulletin C-8

and use of proposed replacement resources.

(3) Specify the need for technical assistance in resolving problems in providing computer accommodation resources.

(4) Specify the need for the Government to be permitted to install additional accommodation devices, peripherals, or software that may be acquired from a third party, without voiding the maintenance and warranty agreements of the contract, provided such devices or peripherals conform to the electrical specifications of the system and can be connected through standard expansion slots or peripheral ports.

(5) Develop functional specifications to meet the access needs of individuals with disabilities (see Attachment A).

d. Consult GSA handbook. Agency managers determining accommodation strategies for FIP resource accessibility should consult the GSA handbook "Managing End User Computing for Users with Disabilities" for guidance. This handbook is available from COCA.

12. COCA services. Upon request for assistance, COCA will:

a. Respond to requests for general information on frequently used hardware/software and workstation furnishings to accommodate individuals with disabilities.

b. Assist agencies with researching specific hardware, software and communications problems associated with an employee's computer accommodation requirements.

c. Provide on-going consultative/technical assistance to agencies during planning, acquisition, and installation of individual and agency wide office automation systems; and

d. Conduct workshops on computer accommodation procedures.

13. Cancellation. FIRMR Bulletins 42, 48, and 56 are canceled.

Thomas J. Buckholtz  
Commissioner  
Information Resources  
Management Service

FIRMR Bulletin C-8  
Attachment A

FUNCTIONAL SPECIFICATIONS

These specifications are organized by functional requirement into three categories: input, output and documentation. This organization reflects the major areas that need to be considered during planning and acquisition. The capabilities set forth in these specifications are currently available from industry in various degrees of functional adequacy, except for access to screen memory for translating bit-mapped graphic images.

GSA will update this attachment to keep pace with technological advances and to address other types of FIP resources.

1. Input alternatives. Access problems concerning the input interface to a microcomputer differ according to the type and severity of an employee's functional limitation. Some users with disabilities are capable of using a keyboard, if it can be modified slightly. Others require an alternative input strategy. The following is an overview of common input alternatives and other input functional requirements that should be considered:
  - a. Multiple simultaneous operation. Microcomputers have many commonly used functions that require simultaneous striking of multiple keys or buttons. Sequential activation control provides an alternative method of operation by enabling a user to depress keys or buttons one at a time to execute the same function.
  - b. Input redundancy. Some programs require a "mouse" or other fine motor control device for input. Some users with motor disabilities cannot operate these devices. An input redundancy feature permits the functions of these devices to be performed by the keyboard or other suitable alternative such as voice input.
  - c. Alternative input devices. The capability to connect an alternative input device can be made available to a user who is not able to use a modified standard keyboard. This feature supplements the keyboard and any other standard input system used. The alternative input capability consists of a port (serial, parallel, etc.) or connection capability allowing an accommodation aid to be connected to the system to augment or replace the keyboard. For example, an alternative input device, such as a switch, eye scan, or headtracking system, may be customized to provide the most effective method of input for a user while supporting transparent hardware emulation for standard input devices, such as the keyboard and the mouse.

d. Key repeat. A typical microcomputer generates repetitions of a character if the key for that character remains depressed. This is a problem for users without sufficient motor control. A key repeat feature can give a user control over the repeat start time and rate by allowing the timing parameters to be extended or the repeat function to be turned off.

e. Toggle key status control. Microcomputer toggle keys provide visual indications of whether they are on or off. A toggle key status feature provides an alternative, non-visual means of showing the on or off status of a toggle key.

f. Keyboard orientation aids. To orient a visually impaired user to a particular keyboard, a set of tactile overlays should be available to identify the most important keys. The tactile overlays can be in the form of keycap replacements or transparent sticky tape with unique symbols to identify the various keys.

g. Keyguards. To assist a motor-disabled user, a keyguard should be available to stabilize movements and help ensure that the correct keys are depressed. A keyguard is a keyboard template with holes corresponding to the location of the keys.

2. Output alternatives. Some users with disabilities need an alternative output to be able to functionally use FIP resources. The following is an overview of common output alternatives, and other output functional requirements, that should be considered:

a. Auditory output. The auditory output capability on current microcomputers is sufficient to beep and play music. However, some users with disabilities may require a speech capability. A speech synthesizer is required to generate speech on today's computers. The capability to support a speech synthesizer should continue to be available in future generations of computers, or this capability may be internalized through an upgrade of the computer's internal speaker. The speech capability should include user-adjustable volume control and a headset jack.

b. Information redundancy. Currently, several programs activate a speaker on the microcomputer to provide information to the user. Some programs do not have the capability to present this information visually to the hearing-impaired user. An information redundancy feature presents a visual equivalent of the auditory information provided.

FIRMR Bulletin C-8  
Attachment A

c. Monitor display. The requirement to enhance text size, reproduce text orally or in braille, or modify display characteristics is crucial for some users with visual disabilities. To ensure that this access continues, the following capabilities are required:

(1) Large print display. There should be a means for enlarging a portion of the screen for a low-vision user. This process uses a window or similar mechanism allowing magnification to be controlled by a user. A user can invoke the large-print display capability from the keyboard or control pad for use in conjunction with any work-related applications software. If applications software includes graphics, enlargement of graphic displays should also be available.

(2) Access to visually displayed information. The capability to access the screen is necessary to support the speech or braille output requirement of many blind users. Currently, blind users are able to select and review the spoken or braille equivalent of text from any portion of the screen while using standard applications software. Third-party vendors should have access to the screen contents in a manner that can be translated and directed to any internal speech chip, a speech synthesizer on a serial or parallel port, or a braille display device. Information presented pictorially also needs to be available in such a manner that, as software sophistication improves, it may eventually be translated using alternative display systems.

(3) Color presentation. When colors must be distinguished in order to understand information on the display, color-blind end users should be provided with a means of selecting the colors to be displayed.

3. Documentation. Access to documentation for computer technology in a usable format should be provided for Federal employees with disabilities. Braille, large print, or ASCII disk equivalents of standard manuals are options to be considered.

